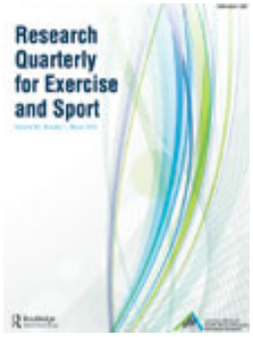

Research Quarterly for Exercise and Sport

ISSN: 0270-1367 (Print) 2168-3824 (Online) Journal homepage: https://www.tandfonline.com/loi/urqe20

A Grounded Theory of Music-Video Use in an Exercise Facility

Jonathan M. Bird & Costas I. Karageorghis

To cite this article: Jonathan M. Bird & Costas I. Karageorghis (2020): A Grounded Theory of Music-Video Use in an Exercise Facility, Research Quarterly for Exercise and Sport, DOI: 10.1080/02701367.2019.1680788

To link to this article: https://doi.org/10.1080/02701367.2019.1680788

RESEARCH QUARTERLY FOR EXERCISE AND SPORT
https://doi.org/10.1080/02701367.2019.1680788

Routledge
Taylor & Francis Group

ARTICLE

OPEN ACCESS Check for updates

A Grounded Theory of Music-Video Use in an Exercise Facility

Jonathan M. Bird* and Costas I. Karageorghis

Brunel University London

ABSTRACT

Purpose: Despite considerable interest in the effects of music in an exercise context, there is a dearth of research examining the use of music-videos. This is surprising given the ubiquity of this medium in exercise facilities. The present study sought to examine the impact of a music-video channel on the social process of exercising in a public exercise facility. **Method**: A grounded theory approach underpinned by pragmatism and symbolic interactionism was employed. Thirteen exercisers completed reflective diaries following each attendance at the facility over a 4-week period. Subsequently, 11 exercisers were interviewed regarding the impact of the music-video channel on the social process of exercising at the facility. Staff members' perspectives were deemed important throughout the iterative process of data collection and analysis. Accordingly, four staff members were interviewed with reference to the social process of managing an exercise facility that featured a music-video channel. Data were analyzed using open, axial, and selective coding. **Results**: The results provide support for a three-stage substantive theory that commences with the content of the music-video channel. The second stage depicts a series of moderators (e.g., exercise factors, temporal factors) that revolve around the core category, appraisal of the appropriateness of channel content. Lastly, a range of effects pertaining to exercisers and facility staff are predicted, and relevant social processes are expounded. **Conclusion**: Given the prevalence of music-video channels in contemporary exercise and health facilities, the substantive theory bears relevance to exercisers, health/performance practitioners, and researchers.

ARTICLE HISTORY
Received 24 July 2018
Accepted 7 October 2019

KEYWORDS
Audiovisual stimuli; exercise psychology; physical activity; qualitative research

Regular engagement in physical activity can lower the risk of heart disease, type 2 diabetes, some cancers, and depression (Rhodes, Saelens, & Sauvage-Mar, 2018). Despite such benefits, physical inactivity remains a global risk factor and is one of the leading contributors to premature mortality (World Health Organization, 2018). Physical inactivity not only poses a significant health risk to the population, but the associated economic burden is substantial; conservatively estimated at an annual cost to healthcare systems worldwide of $53.8 B (Ding et al., 2016). Accordingly, there is a compelling case for interventions that focus on the enhancement of physical activity behaviors. Such interventions can be administered to individual exercisers (e.g., advice from health practitioners) or implemented at the population level (e.g., through making environmental changes).

One such environmental change in the exercise context entails the addition of music. Advances in digital audio media have ensured that music is more readily available today than ever before (Park, Thom, Mennicken, Cramer, & Macy, 2019). Consequently, music has become an almost ubiquitous stimulus in exercise contexts; it is played over public address systems, can be enjoyed via personal listening devices, and is a key component of group exercise classes such as BODYPUMP and Zumba (Karageorghis, 2017). Such widespread use of music has led to an expansion in the research base addressing the effects of music and the mechanisms that underlie its effects. For example, Juslin (2013) theorized that individuals' affective responses to music are governed by eight mechanisms: brain stem reflex, rhythmic entrainment, evaluative conditioning, contagion, visual imagery, episodic memory, musical expectancy, and aesthetic judgment.

A number of conceptual frameworks that are grounded in psychology have been advanced to account for the contingencies and effects of music use in exercise settings. For example, Karageorghis (2016) developed a framework that emphasized the relationship between the music, listener, and context in which the individual is engaged. Several musical factors were identified as antecedents and presented in a hierarchy of intrinsic (e.g., tempo, melody) and extrinsic (e.g., iconic cues, cultural associations) factors. Moreover, the consequences of music use in exercise settings were highlighted (e.g.,

CONTACT Costas I. Karageorghis costas.karageorghis@brunel.ac.uk Department of Life Sciences, Brunel University London, Kingston Lane, Uxbridge UB8 3PH, UK

*Present address: University of Exeter

positive affective states, reduced rate of perceived exertion [RPE]) and ranked in an order that is consistent with their prevalence in the research literature. A range of personal (e.g., personality, hearing acuity) and situational (e.g., sound source, intensity of exercise) factors were proposed to moderate the relationship between the music stimulus and the consequences. In addition, the model has a reciprocal structure given that feedback loops run from the consequences, through the moderators, and back to the antecedents; meaning that the consequences of music use have a bearing on future selection decisions.

Twenty-first century technologies have not only ensured that music is more accessible, the capabilities of devices such as smartphones and multichannel digital televisions mean that music-videos are increasingly prevalent in exercise facilities. Nonetheless, research examining the effects of music-videos during exercise remains at a nascent stage, with fewer than 10 published articles to date. This line of scientific inquiry was initiated by Lin and Lu (2013), who found that participants cycled further and reported lower RPE scores when exercising with music-videos compared to video only, music only, and control conditions. Lin and Lu's (2013) findings were partially supported by Bigliassi et al. (2014), who indicated that participants reported lower RPE while performing a muscular endurance task with music-video accompaniment compared to sensory deprivation and control conditions. Music-videos have also been shown to reduce RPE, enhance affective responses, and promote a more dissociative attentional focus at exercise intensities proximal to or directly at ventilatory threshold (VT; i.e., when breathing becomes labored during exercise) when compared to music and/or control conditions (Bird, Hall, Arnold, Karageorghis, & Hussein, 2016; Hutchinson, Karageorghis, & Jones, 2015).

Despite some initial findings purporting the benefits of exercise with music-video, there are considerable gaps in the knowledge base that need to be addressed for this line of scientific inquiry to flourish. Firstly, the vast majority of research has taken place within controlled laboratory environments (e.g., Hutchinson et al., 2015; Lin & Lu, 2013). While this approach has been useful to establish causality when examining the impact of music-videos on physical and psychological outcomes (e.g., more positive affective responses; Jones & Ekkekakis, 2019), we do not yet understand the impact that music-video channels have on the social process of exercising in a real-world context. Furthermore, researchers have typically employed samples of university students in their late teens/early twenties, often from a sports science background (e.g., Bird et al., 2016). Selecting participants with such a narrow age range does not reflect the reality of exercise facilities, which often accommodate members from across the lifespan (Hallett & Lamont, 2015). Such shortcomings in the literature provided the basis for our initial research question: How does the presence of a music-video channel influence the social dynamics of exercising in a real-world context?

Another limitation concerns the paucity of conceptual frameworks to inform the selection of suitable music-videos in exercise contexts. Researchers, exercisers, and practitioners can use conceptual models (Clark, Baker, & Taylor, 2016) and rating inventories (Karageorghis, 2017) to help guide musical selections, but the same does not apply to the accompanying visual stimuli, owing to a lack of relevant theory. Qualitative research, such as grounded theory, represents an insightful approach when the researcher's aim is to explain a social process in a specific context, upon which a sufficient pre-existing theory has yet to emerge (Corbin & Strauss, 2015; Weed, 2017).

Process has been described as the "rhythm as well as the changing and repetitive forms of action–interaction plus the pauses and interruptions that occur when persons act and interact for the purpose of reaching a goal or solving a problem" (Corbin & Strauss, 2015, p. 172). In providing a metaphorical example to illustrate this term, Corbin and Strauss liken process to a scene commonly observed in a coffee shop, in which a waitress's actions/interactions differ over time in response to different scenarios. In a similar vein, exercising in a contemporary facility represents a type of process wherein individuals are required to navigate the social space and be cognizant of other exercisers in order to achieve the shared objective of enhanced health/body shape. Thus, grounded theory represents a suitable approach to investigate the impact of a music-video channel within a social setting, and its absence from the extant literature is surprising. To address this dearth in the literature, the purpose of the present study was to develop a substantive theory that explained and predicted the social process of exercising in the presence of a music-video channel. The construction of such a theory would inform health practitioners' use of music-video interventions, guide exercisers' music-video selections, and advance this nascent line of scientific inquiry.

Materials and methods

Grounded theory methodology

Corbin and Strauss's (2015) variant of grounded theory, underpinned by pragmatism and symbolic interactionism, was employed as a "total" methodology in this study (Weed, 2017). Such a position directs scholars' attention toward research questions and methodologies that can make the greatest applied impact to the

individuals and groups they examine (Corbin & Strauss, 2015; Morgan, 2014). Corbin and Strauss's (2015) variant of grounded theory was considered appropriate for the present study given our desire to construct a substantive theory that would hold practical utility for researchers and practitioners working in real-life settings.

Research site

The initial research question (i.e., How does the presence of a music-video channel influence the social dynamics of exercising within a facility?) helped determine the research site and the people with whom to communicate in order to obtain the best answers (Corbin & Strauss, 2015; Holt & Tamminen, 2010b). An exercise facility located in the UK was chosen as a suitable site for data collection. The facility employed 25 staff members and accommodated ~1750 exercisers per week (M_{age} = 40.0 years; equal female–male distribution; predominantly White/British ethnicity). Moreover, the facility comprised two primary exercise environments and contained wall-mounted televisions that displayed a variety of channels (e.g., news, radio, music-video). The choice of which channels were played was determined by facility staff. Access to the site was gained by the first author who had exercised at the facility but was unconnected to the staff and clientele.

Sampling and participants

Study recruitment was conducted through word-of-mouth and aided by means of promotional posters at the exercise facility. Sampling and data collection processes occurred over five phases (see Figure 1). Initially, participants were purposively sampled (i.e., sampling driven by the nature of the research question). Given the need to consider diverse perspectives (Corbin & Strauss, 2015), there were no restrictions concerning the personal characteristics or audiovisual preferences of participants. Rather, it was the researchers' intention to recruit a sample that were familiar with exercising in the presence of the audiovisual stimuli used in the exercise facility. Hence, inclusion criteria specified that individuals used the facility a minimum of two times per week and that they had been members of the facility for at least 2 months.

Grounded theory involves an iterative process between data collection and analysis, a notion that echoes the symbolic interactionist concept of action and interaction (Corbin & Strauss, 2015). Theoretical sampling facilitated this process, wherein participants were selected for phases 2–5 on the basis of concepts that were being refined and developing ideas (see Figure 1). The researchers followed the trail of emerging concepts, by searching for participants who could provide rich information pertaining to such concepts until an adequate level of saturation was reached (Corbin & Strauss, 2015; Weed, 2017). Striving for theoretical saturation ensured congruence between the resultant substantive theory and relevant music-video channel-related phenomena (i.e., "fit"; Weed, 2017). The overall sample consisted of 13 exercisers (6 women, 7 men; M_{age} = 42.7 years, SD = 6.7 years, age range: 25–49 years) as well as two male and two female staff members (M_{age} = 36.8 years, SD = 12.3 years, age range: 28–55 years). The ethnicities represented by the overall sample were White/British (n = 14), White Other (n = 2), and Indian (n = 1).

Data collection

Ethical approval was secured from the authors' institution. Facility users who expressed an interest in participating in the study were contacted via e-mail or telephone. The first author met with each participant and they read an information sheet, provided informed consent, and completed a demographic questionnaire. In order to adequately address the research question, it was agreed with the facility manager that one of the primary exercise environments would display the music-video channel *4Music*, for a period of 6 weeks at a standardized sound intensity (~75 dBA). The inclusion criteria served to ensure that participants were familiar with exercising in the presence of a variety of audiovisual stimuli. However, it was hoped that exposure to a *music-video* channel during exercise would enrich participants' experiences during the first phase of data collection (Corbin & Strauss, 2015).

Reflective diary

A review of literature was conducted in order to identify a range of sensitizing concepts that informed the construction of a one-page diary (Clark et al., 2016; Hutchinson et al., 2015). Such concepts have been described as "points of departure" (Holt & Tamminen, 2010a, p. 410), because they represent open-ended ideas to pursue and act as a place to start, rather than end (Weed, 2017). Thirteen exercisers completed a handwritten diary entry over a 4-week period during each occasion they visited the facility and produced a total of 91 diary sheets. The diary sheet questions were purposely minimal so as not to influence participant responses (e.g., "What effect did the music-video channel have on your behaviors, if any?"). Reiterating the idea that the diary questions served as points of departure, participants were encouraged to complete an additional comments section upon each diary entry and to specify up to three memorable music-videos.

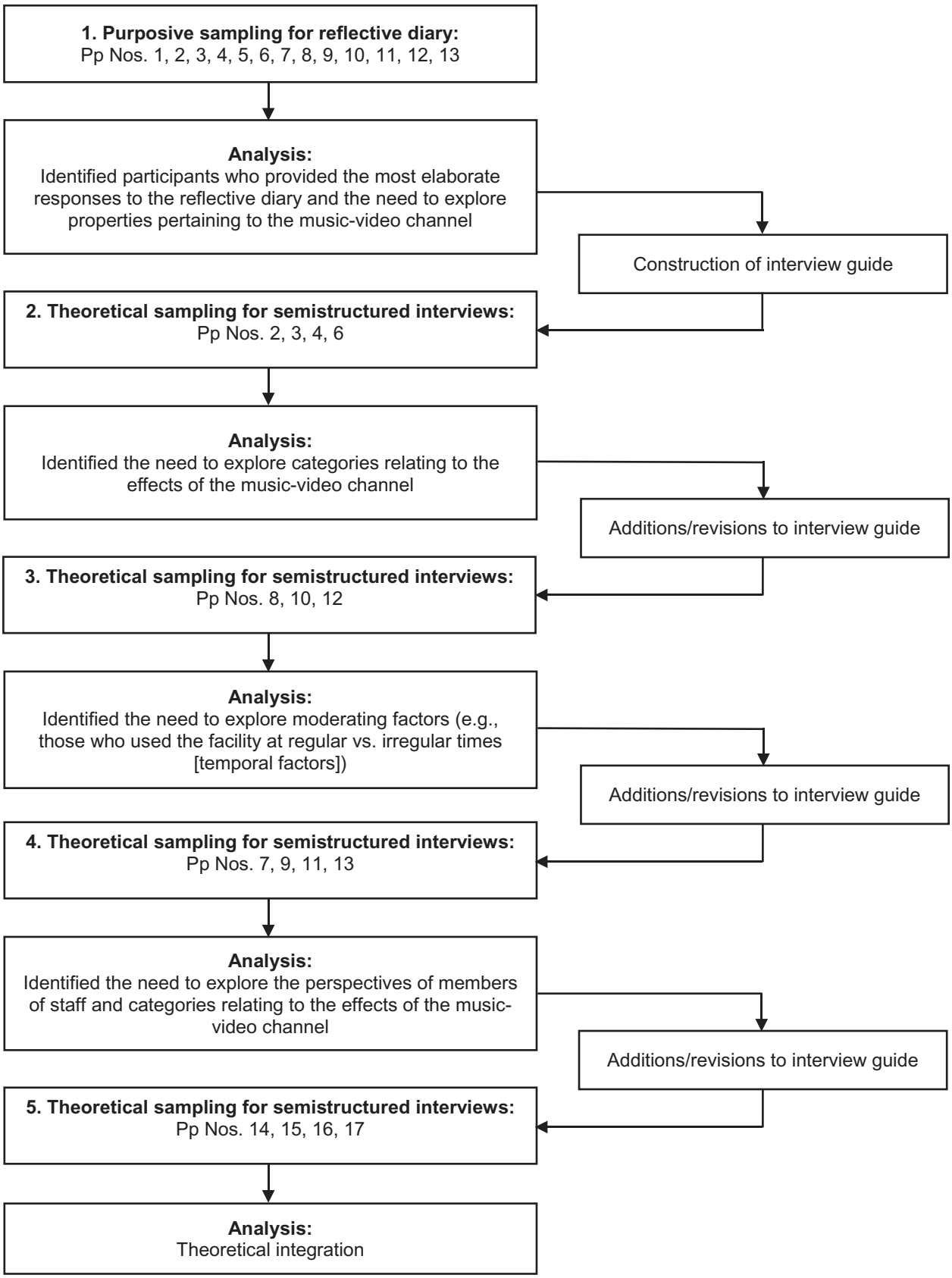

Figure 1. Forms of data collection, rationale for inclusion of participants, and participants sampled for each iteration of data collection. *Note*. Pp Nos. = participant numbers.

Following the 4-week diary period, participants specified two memorable music-videos.

Semistructured interviews

Participants' diary sheets helped in identifying several concepts and categories that aided the development of a semistructured interview guide. The questions were open-ended and initially focused on the music-video channel (e.g., "What does an effective music-video mean to you in a social exercise context?"). The two music-videos that each participant considered memorable from the reflective diaries were legally downloaded from Apple iTunes. Participants watched their specified music-videos on a laptop in a quiet room at the exercise facility. Thereafter, they were interviewed with reference to the impact the music-video channel had on the social process of exercising at the facility. As the iterative process of data collection and analysis continued, the interview guide was updated to reflect additional concepts and categories that emerged, and participants were theoretically sampled in accordance with this (see Figure 1).

Grounded theory research questions can transform in light of emerging categories (Corbin & Strauss, 2015). The perspectives of *staff members* were also deemed important after the ongoing analysis revealed that the environment was a key category and that, ultimately, staff were responsible for how the facility, as a social space, was constructed. Accordingly, our research question changed to accommodate this development (i.e., How does the presence of a music-video channel influence the social dynamics of running an exercise facility?). Staff members were theoretically sampled, and the interview guide was updated in order to explore their perspectives (e.g., "What is the decision-making process that underlies the selection of audiovisual material at the facility?"). The theoretical sampling of staff members enhanced the "relevance" (Weed, 2017) of the resultant substantive theory by accommodating both populations that characterized the social environment (i.e., exercisers and staff). Participants read an information sheet, provided informed consent, and completed a demographic questionnaire. Four staff members took part in this phase of data collection. Interviews lasted 20–65 min (M_{duration} = 40:11 min, *SD* = 12:59 min), were digitally recorded and transcribed verbatim to yield 173 pages of single-spaced text.

Data analysis

Diary and interview data were organized using qualitative analysis software (NVivo for Mac v.10) and analyzed in accord with the coding recommendations of Corbin and Strauss (2015). This process was predicated on the interaction between data collection and analysis (Holt, 2016). Thus, the analysis commenced with the participant diary sheets, the content of which informed the direction of the first semistructured interview. Subsequently, this informed the direction of the next semistructured interview and so forth.

The constant comparative method was employed. As the first author moved along the analysis, each incident (i.e., the words of a participant) was compared with other incidents for similarities and differences (Corbin & Strauss, 2015; Holt, 2016). Incidents that were found to be conceptually similar were placed together under a higher-level descriptive concept (e.g., audiovisual preferences, audiovisual accessibility). Subsequently, comparisons were made across incidents and developing concepts, among concepts, and finally, between categories (e.g., exercise factors) and existing theory (e.g., Clark et al., 2016; Juslin, 2013; Karageorghis, 2016). Other analytical tools were used to facilitate the coding process, such as the asking of sensitizing questions and considering the meanings of words used by participants (Corbin & Strauss, 2015). Such tools promoted the interaction between the researcher and the data, stimulated conceptual thinking, and enhanced our ability to negotiate participants' perspectives (Blumer, 1969).

Each transcript was read in its entirety to gain a sense of the overall context of the data and to enter vicariously into the life of participants. Open coding took place that sought to "fracture" the data by breaking it into manageable sections and exploring the ideas contained within. Several concepts were identified and examined in regard to their properties and dimensions (Corbin & Strauss, 2015). Axial coding was then used to reconstruct data that were fractured during open coding. Concepts were assembled into categories, which were then examined in order to identify higher-level categories and subcategories, and to refine and make connections between them. This process served to promote theoretical sampling with the identification of categories that required further saturation (Holt, 2016).

The data were then analyzed using selective coding, whereby categories were integrated to form a larger theoretical model. Theoretical integration was attained by developing relationships among categories and comparing them with the extant literature (e.g., Karageorghis, 2016). A key consideration at this stage of analysis was that the resultant substantive theory could explain, interpret, and predict the social process of exercising in the presence of a music-video channel (i.e., "work"; Weed, 2017). We also endeavored to ensure that the structure of the theory could accommodate future research (i.e., "modifiability"; Weed, 2017). The first author conducted all coding procedures independently. Thereafter, the two authors collaboratively explored the meaning ascribed to the codes.

The process of moving from description to conceptualization was aided by the use of memos, which enabled the

recording of ideas, insights, and questions while the theory evolved within the iterative process (Corbin & Strauss, 2015). A possible version of the grounded theory was diagrammed during the planning stages of the present study to facilitate theoretical thinking, as opposed to descriptive thinking (Holt, 2016). Data collection and analysis ceased when an adequate level of theoretical saturation was reached (Corbin & Strauss, 2015). At this point, the collection of new data seemed counterproductive, because it failed to generate additional insights related to how a music-video channel influenced the social processes of those using and working in an exercise facility. The resultant substantive theory was evaluated using the quality criteria of "fit" (i.e., do the concepts and theory resemble the music-video channel-related phenomena?), "work" (i.e., does it provide an appropriate analytical explanation for how music-videos are interpreted?), "relevance" (i.e., does it account for each population present within the environment [i.e., exercisers and staff members]?), and "modifiability" (i.e., can it be developed further to accommodate the insights derived from future research?; Weed, 2017).

Results

The diary sheets and interviews provided rich and thick data pertaining to the social process of exercising in the presence of a music-video channel and managing a facility that displays such a channel (see Figure 2). When viewed from top to bottom, the model depicts a three-stage process commencing with the content of the music-video channel. A series of moderators are proposed, which contribute toward the core category of the model, an appraisal of music-video appropriateness. Thereafter, a range of effects caused by the music-video channel are presented. Such effects have the potential to cause conflict within the facility and such conflict is ultimately resolved via accommodation. The study took place in a context that consisted of two populations that interact socially with one another; exercisers and staff. Accordingly, the left side of the model represents the perspective of individual exercisers and the right represents the perspective of facility staff.

Music-video channel

The music-video channel is located equally between the individual exerciser and facility staff, given its equal importance to the two populations that coexist within the social context. Exercisers are subjected to such stimuli and yet the staff are ultimately responsible for the nature of the stimuli. Interviewees indicated that the channel presented two main forms of stimuli, music-videos and extraneous stimuli.

Music-video properties

Participants described a variety of properties relating to the music, video, and music-video collectively. For example, all participants had expectations that the music should "have the right tempo for a gym" (Participant 3; interview). Although this expectation is moderated by a range of factors that are discussed herein, it appears that the "right" tempo in this context is fast (e.g., ≥ 120 bpm). Otherwise, the music-videos were described as "too slow to help [facilitate exercise]" (Participant 6; reflective diary). Furthermore, participants identified a range of additional musical components that were deemed important in exercise contexts such as the rhythm, harmony, and lyrical content.

Regarding the video properties, components such as the color, lighting, narrative, characters, and location depicted in the video appeared to be salient in exercise settings:

> Happy, uplifting, brightly coloured videos made me work out quickly … If there was a sense of being drawn into the movement, all the better. That is, if the video was shot as if you were on the bike too … Anything expansive, such as cityscapes and landscapes, skies and sea, made me feel transported elsewhere and gave me a sense of happiness and energy that translated into working out that bit harder … videos with a narrative arc … were good at keeping me interested and going until I, too, reached the conclusion of that section of my workout. (Participant 12; reflective diary)

Participants suggested that the video properties could make the audio seem "more positive or negative … the audio alone is a happy medium … it [the video] has the potential to be beneficial … it also has the potential to really tick me off" (Participant 8; interview). Hence, consideration should be given to the audio *and* visual components that comprise audiovisual stimuli if we are to fully harness the associated benefits in exercise contexts.

Components unique to music-videos collectively, such as the release date, the duration, and variation of music-videos played on the channel were also identified. Furthermore, participants provided support for the idea that the congruence between the audio and the visual content influenced how they responded:

> If the images on the screen are not associated with what I'm listening to, I can completely tune it out, but when it's a music-video and its associated, you're drawn to it, because everything's in rhythm, everything's connected, it's a lot harder to ignore it. (Participant 8; interview)

Thus, it appears that music-videos may represent a more potent form of distraction than other forms of audiovisual

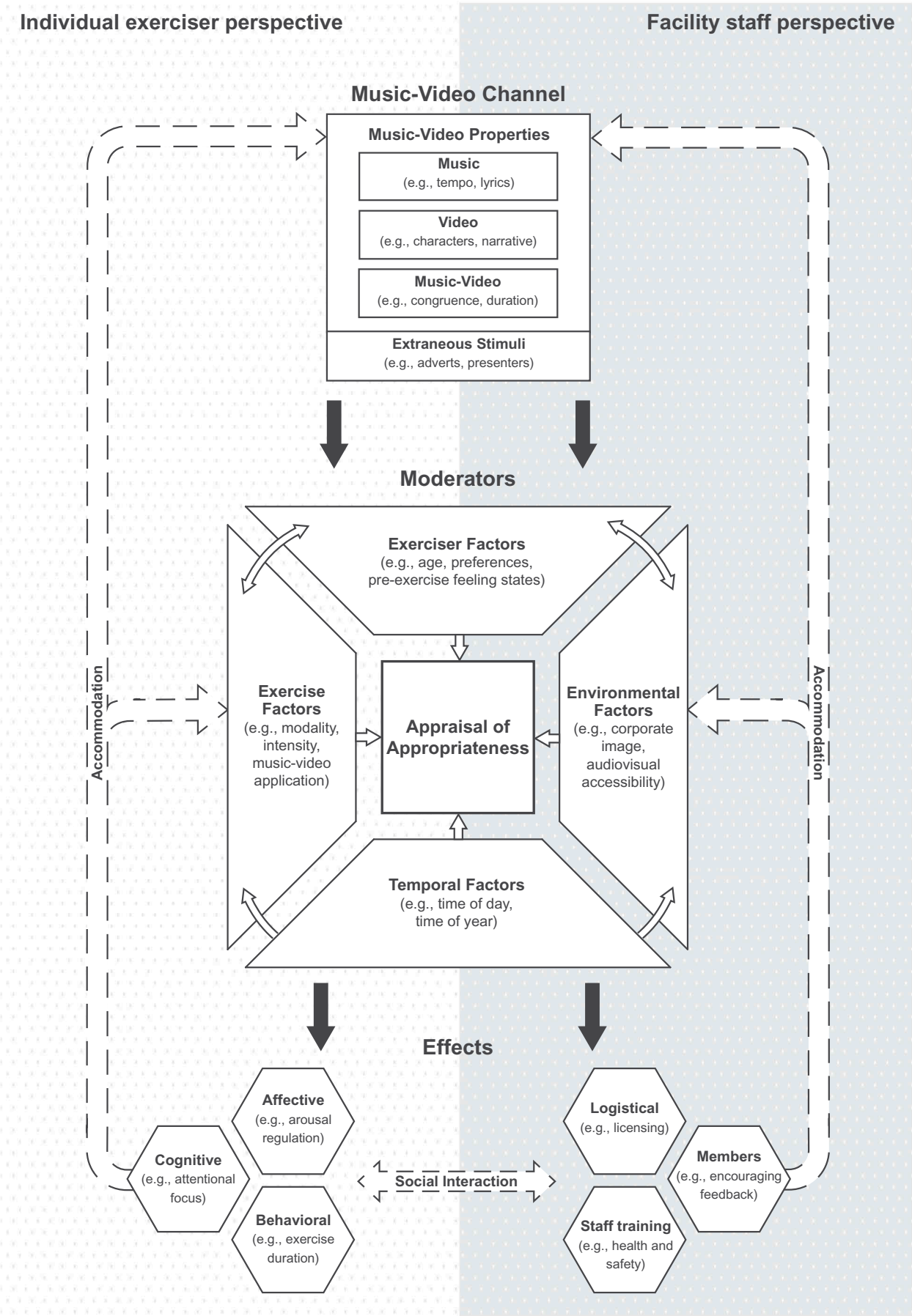

Figure 2. A grounded theory of exercising with output from a music-video channel.

stimuli, which present audio and visual stimuli that are incongruent in nature (e.g., television programs with musical accompaniment).

Extraneous stimuli

Music-videos represented the majority of the channel's content. Nevertheless, broadcasters supplement such channels with additional content that might be considered extraneous or irrelevant, such as other programs and adverts:

> Updates on what Kim Kardashian is doing this week, or Rita Ora spent a lot of time hanging around on a boat not wearing very much … and then adverts, and particularly adverts for things like chocolate and McDonald's and Burger King, which I just thought was totally and utterly inappropriate in a gym. (Participant 3; interview)

It appears that the source of the participants' frustration is not completely attributed to the *presence* of extraneous stimuli, but the fact that they "interrupt the flow of the tracks" (Participant 7; reflective diary). Hence, extraneous stimuli can be viewed as a form of disruption to both the audio and visual stimulation provided by music-videos on the channel.

Moderators

The second stage of the model depicts the categories that are proposed to influence the effects of a music-video channel in exercise facilities.

Appraisal of appropriateness

The core category of the developed model is an appraisal of appropriateness pertaining to the music-video channel: "I just think that you need to consider that the channel you're listening to is appropriate" (Participant 16; interview). But what concepts make a music-video channel appropriate vs. inappropriate? Data from reflective diaries identified many instances in which the content was deemed appropriate:

> I watched a [music-] video that contained long stretches of a cyclist going along different roads, with scenery changing around him. It was filmed so that you felt you were riding the bike. It made for a really good and uplifting 4 minutes on the bike; like I had travelled that journey. (Participant 12; reflective diary)

Music-videos depicting exercise were welcomed by participants and this offered a useful starting point to help us understand how such videos were appraised to be "appropriate". The ongoing collection and analysis of interview data revealed that the ways in which participants made sense of and ascribed meaning to the content of the music-video channel involved several additional concepts beyond those directly related to exercise. Participant 3, who disliked music-videos, hinted at the factors that led to an appraisal of inappropriateness:

> I didn't think it was particularly appropriate. Particularly as I normally exercise in the morning … the clientele that is here, I'm probably the youngest … and you can imagine that some of the people here found it distinctly uncomfortable … alongside that I thought that people running around with no clothes on at kind of half-eight in the morning was a little bit too much to take. (interview)

The analysis revealed that participants' appraisal of appropriateness was influenced by a range of factors that included the exerciser and exercise mode as well as the social environmental and temporal factors; such factors are expounded herein.

Exerciser factors

The appropriateness of the music-video channel appeared to be moderated by a range of exerciser factors such as age, gender, audiovisual preferences, and cultural upbringing: "I think all preferences have to have some wider cultural influence on you as to what you've been exposed to, and what you're familiar with, and what your friends are familiar with" (Participant 13; interview). Female participants were more likely than their male counterparts to appraise the content of the music-video channel as inappropriate. While watching music-videos, females often wondered "why are women portrayed like this?" (Participant 6; interview). Further probing suggested that the unequal portrayal of the genders was a major concern: "there were just continuously people running around with no clothes on—women. And if there had been men running around with no clothes on as well that would have been fine, but there wasn't an equal balance". (Participant 4; interview).

Participants' feeling states prior to exercising influenced how they appraised the music-video channel. Specifically, exercisers described that feeling states (e.g., mood) lowered the threshold for related feeling states (e.g., emotions) to occur:

> We all have good days and bad days … on a good day, if I came in and Paloma [Faith] was on there belting it out and I was already in a good mood, actually I might go "cor, yeah, I do feel properly happy now!" Whereas, if I was late and in a miserable mood and Madonna came on … I'd go "for God's sake" (Participant 4; interview)

As an illustration of the social processes at play, staff members took an active interest in exercisers' audiovisual preferences, stating that "it's about kind of appeasing everybody, obviously, we've got so many different age ranges here, we don't want to discriminate against

anybody" (Participant 14; interview). Accordingly, exerciser factors bear relevance not only to the individual but also the staff members and are thus positioned centrally in the proposed model (see Figure 2).

Exercise factors

The decision to engage in exercise is ultimately under the control of the individual and thus the exercise factors are situated on the left of the model (see Figure 2). The analysis revealed several exercise factors that would alter participant's perception of how appropriate music-videos were, including the duration and intensity of exercise:

> [For] an intense kind of session, I would rather watch a video that was probably more aligned with some kind of intense activity, *Insanity* or something like that … If I was on the running machine for an hour … probably for the first few minutes I would like to have something intense but then the whole kind of getting your mind off it would probably be something that I would prefer. (Participant 10; interview)

How participants chose to apply music-video to their exercise regimes was also a seminal factor. Interviewees explained that they exercised in synchrony with music-videos: "there was a song that came on and it was perfect for the movement of my legs and after a bit, it was almost as if the song was doing the work" (Participant 4; interview). This mechanism has been referred to as "rhythmic entrainment" and has been suggested to influence affective responses to music (Juslin, 2013). Equally, participants used music in the asynchronous mode: "the [music-] video is in the background providing some sort of distraction from the hideous thing that I am doing" (Participant 3; interview).

Environmental factors

In contrast to the exercise factors, the environmental factors are primarily governed by the facility staff and are therefore situated on the right-hand side of the model (see Figure 2). Environmental factors concern the physical (e.g., size of the facility) and perceived (e.g., corporate image) components of the exercise location and how the music-video channel is set up. Numerous factors emerged that warrant consideration when displaying a music-video channel in an exercise context, such as the notion of accessibility: "There's a lot of places where you can't see anything … sometimes you're either a bit too close or just looking at the side of the screen, and that's not great" (Participant 11; interview).

In stark contrast to related studies conducted in a laboratory setting, which often entail contributions from one experimenter and one participant, exercise facilities are replete with opportunities for social interaction with other exercisers:

> If I was doing a 10 km and I was 7 km into it and someone came and sat down next to me, looked over like they do, and started rowing a bit quicker, I would think right, stuff it, you don't know I've been sat here for half an hour already, watch this and they [the exercise facility] could have been playing anything and I wouldn't have known what it was. (Participant 4; interview)

Accordingly, the findings provided support for the notion that others within the environment have the potential to alter one's perceptions of a music-video channel.

Temporal factors

The analysis revealed that temporal factors such as the time of day were influential in determining how participants made sense of the music-video channel:

> I don't know if there are music-videos without this excessive amount of flesh on show, but I do think the sexism and the nudism was quite inappropriate, now whether that is more appropriate at six at night when people come out from work and it's a different clientele … it probably is. (Participant 3; interview)

Although the content of the channel varied throughout the day, participants indicated that they quickly grew bored of the music-videos if they used the exercise facility at the same time of day throughout the week: "I train at about the same time when I visit the gym. [The exercise facility] just repeats the Top 20 so we see the same videos—it gets boring" (Participant 13, reflective diary). Hence, it appears that facility staff should be mindful to regularly update and refresh the audiovisual stimuli.

Relationships between moderators

There are bidirectional relationships among the exerciser, exercise, and environmental moderators. Thus, participants suggested that exercise factors (e.g., modality and intensity) influenced environmental factors (e.g., audiovisual accessibility):

> One [screen] is to your left and you have to sort of look to your left and up and if you're doing the crosstrainer and working hard … if you're yanking your head up and to the left, it's actually really difficult … when you're tired, you don't do that, your head tends to drop slightly … (Participant 13; interview)

The temporal factors maintain a unidirectional relationship with the exerciser, exercise, and environmental factors. For example, participants' pre-exercise feeling states (i.e., an exerciser factor) differed in accord with the time of day:

> Well considering I exercise early, for me, after the kids have gone to school, the emotional ones really tapped into

> that feeling of, not quite awake, and that's when you're more emotional I think … (Participant 12; interview)

The facility staff were also aware of the interaction among the moderators, such as the degree to which temporal factors influenced the type of exercisers in the facility:

> In the mornings we tend to get the older members come in. Some early afternoons you get students, you get people on their lunch breaks and then in the evenings you get all the office workers coming in … depending on what you can try and perceive your clientele to be like and what they might be interested in, you can then try and figure out a channel to put on that's specific to them. (Participant 17; interview)

Participants entered the exercise setting with meaning already ascribed to music-videos; this was based on prior exposure (i.e., exerciser factors). Nonetheless, such meanings were influenced by the presence of other exercisers (i.e., environmental factors), before an interpretative process took place (i.e., appraisal of appropriateness) to evaluate the stimuli presented. This is plausible given that participants often evaluated the appropriateness of the stimuli not only in accord with their personal preferences, but also the perceived preferences of other exercisers. For example, an "extremely contentious" (Participant 8; interview) issue with music-videos is that they often contain "a lot of cheap sex … and people not wearing very much" (Participant 7; interview). Regarding such content, Participant 3 suggested that "if somebody wanted to watch that in their own house, that's fine" (interview). Nonetheless, it appears that within a public facility, the music-video selection process should be influenced by exercisers' collective preferences.

Effects

The final stage of the developed model depicts the effects that the music-video channel can have on individual exercisers and the facility staff. The analysis revealed that exercising in the presence of a music-video channel could elicit a range of affective, cognitive, and behavioral outcomes. Importantly, such outcomes can be considered to range from "desirable" to "undesirable" based on the degree to which individuals deemed the content to be appropriate. Participant 12 described how music-videos deemed to be inappropriate could elicit undesirable affective states:

> What didn't work were videos of live performances, gigs, or just a video of a girl/boy band on a stage in the studio. I found these the opposite of lively, and very often they made me feel flat. I guess I wanted to feel involved physically or emotionally in the video … this type of video made me feel excluded and deflated. (reflective diary)

Conversely, music-videos that were deemed to be appropriate often led to positive affective states. When the onscreen performers projected such affective states, they would often be reflected by participants:

> She's exuberant and happy … there's this sort of happy energy that comes out of her, and it almost feels as if when you're exercising you can steal or borrow some of that … there's bits when she's saying, "this isn't what I've signed up to" so there's a feeling that she's trying to take a thing that isn't so great and turn it into a better thing perhaps as part of the song, which is a positive emotion. (Participant 4; interview)

The analysis revealed that the music-video channel could also facilitate a range of cognitive effects during exercise, including personal associations and self-talk. Moreover, participants suggested that the channel content prompted *attentional dissociation*, which refers to the way in which audiovisual stimuli can divert attention from interoceptive cues (e.g., labored breathing; Bird, Karageorghis, Baker, & Brookes, 2019). Similar to the affective states elicited by music-videos, participants deemed such cognitive effects to be desirable or undesirable. Thus, participants detailed that the music-videos were "a distraction rather than a help" (Participant 4; interview) *and* a "positive distraction to what I'm doing" (Participant 2; interview). There was evidence to suggest that this might be influenced by one's dominant attentional style (Hutchinson & Karageorghis, 2013), which pertains to an individual's tendency to focus on task-related or task-unrelated cues (Karageorghis, 2017):

> I've got friends that actually would find it [music-video] very good and positive, and they would get distracted and do more, some friends that come along and as soon as they start getting out of breath they just stop, but actually if they were watching that, then maybe they would just keep going without thinking. (Participant 9; interview)

Several behavioral effects were evident. Participants explained that appropriate music-videos could help to enhance work output, prolong exercise duration, and regulate the time spent on pieces of equipment: "I used them [music-videos] as a deadline for the time I spent on each area" (Participant 1; reflective diary). Conversely, music-videos that were deemed inappropriate led to undesirable behavioral effects such as reduced work output:

> [A music-video] would come on that would help me flip into the rhythm I wanted to hit quicker, almost like I could align with it and I think that was a helpful thing. Equally, something could come on when I got into a good rhythm, and then … a ballad again, there's nothing to work with there, absolutely nothing and

> actually I find myself going slower and slower and slower. (Participant 4; interview)

Another behavioral response to emerge from the ongoing analysis was that of behavioral transference. In response to a music-video that depicted elaborate skyscapes, Participant 12 explained: "I started doing the crosstrainer because it felt quite outdoorsy, I wanted to actually stand up more than being [stationary] on my bike" (interview). Such effects might be attributed to mirror neurons, whereby specific behaviors depicted on screen were mirrored by participants in the gym (Ferrari & Rizzolatti, 2014).

The data indicated that displaying a music-video channel had a range of implications for the facility staff that can be categorized as logistical, staff related, or member related. Regarding the logistical implications, the facility had to comply with licensing regulations in order to publicly display the channel, which had direct implications for budgeting. Nonetheless, facility staff felt that the benefits of displaying the channel outweighed the associated costs: "It's going to cost to run them … but if you don't have a visual motivation in there then people are just kind of looking at themselves running in a mirror" (Participant 14; interview). The choice of digital broadcasting provider was another logistical implication that warranted attention, although having a range of channels wasn't always advantageous:

> It's quite nice to have quite a varied range of what [channels] you want to put on there. However, it then sometimes causes problems because members know what channels you've got … it goes back to the whole issue of, they want this and don't want that on. So, yes, it is a nice luxury, because you have that variation, however I think it cause issues sometimes, because then if you didn't have a wide range, you wouldn't have to keep changing it over. (Participant 16; interview)

In addition to the associated logistics, facility staff suggested that an active concern of theirs was staff training. Staff members were trained in a variety of areas that aided them with the task of running the music-video channel, including establishing a daily routine, conducting a review process, and knowing how to resolve conflict. Moreover, staff members took a range of precautions to ensure the health and safety of patrons and fellow staff:

> I don't think gyms should have absolute [intensity], as if you're at a rock concert, you know, if it's a class that's different, but I think you know, it's not healthy for the trainer. I don't want to go deaf when I'm 60 [years old]. (Participant 15; interview)

The inclusion of a music-video channel also had implications for staff with regard to facility members. For example, the following participant explained that the music-video channel had the potential to enhance the gym experience:

> If I was sitting here and somebody said "well, you know, we have our own music-video channel that has been specifically researched and it has particular music for particular times of the day, so if you're here at 9.00 am it's feel good music but if you're here at 5.00 pm it's de-wind after your stressful day at work music", I mean that actually sounds quite cool. (Participant 3; interview)

The findings pertaining to the implications for facility staff suggest that displaying a music-video channel in an exercise facility is not simply a case of switching on several television screens. There are abundant implications that require careful consideration if music-videos channels are to be used effectively within a social exercise context.

Social interaction

The effects of the music-video channel had the potential to prompt social interaction between individual exercisers and facility staff. When exercisers appraised the content of the music-video channel as inappropriate and experienced undesirable effects (e.g., negative affective states), social interaction would follow: "Oh, they [exercisers] would tell us [staff members] if there was something [music-video] on which they didn't approve" (Participant 15; interview).

Given the number of factors that are proposed to contribute toward an appraisal of appropriateness (i.e., exerciser, exercise, environmental and temporal), ensuring that every member is always satisfied appeared to be an unrealistic expectation: "I think it's impossible to cater for everyone, you just try and cater for the majority I think, you're never going to please everyone … that was the hardest thing I found, moving into my current position" (Participant 14; interview). Bearing this into consideration, some conflict might be *inevitable* in settings where communal television screens are used.

Conversely, when exercisers appraised the content of the music-video channel as appropriate and experienced desirable effects (e.g., attentional dissociation), there was evidence to suggest that participants became more amenable to social interaction:

> I don't really pay much attention to other people and what they're doing, but I became more aware of other gym members simply because we were watching and listening the same thing … I then began to see that there may be other benefits, like treating a gym visit as more of a social event. You could say that it made me feel happier in that regard, and, if a sense of overall wellbeing is tied to what you want from a workout, you

> could say that was productive side-effect. (Participant 12; reflective diary)

Participant 12 typically exercised with a personal listening device. Accordingly, it appears that an appropriate music-video channel might prompt individuals to burst their personal "listening bubbles" in order to enjoy exercise alongside others in a social context. This is important, as staff members intonated that the increasing rate at which individuals were engaging with personal technology served to undermine social interaction at the facility:

> I think that we've lost this homely effect, it's like people rather than talk to another person will look at their phone … so before it used to be, you know, a bit of a face-to-face chat and a bit of banter, nowadays I notice when someone leaves the gym or even in the gym, they're glued to their phone. (Participant 15; interview)

Accommodation

When exercisers experienced undesirable effects in the presence of the music-video channel, they would employ a range of strategies that could facilitate accommodation. The social process of accommodation entails individuals or groups making adjustments to a new situation in order to resolve conflict and promote equilibrium. The strategies that exercisers employed were targeted toward exercise factors, or the music-video channel (see Figure 2). With regard to the former, participants indicated that they would change components of their exercise session (e.g., modality, intensity), as expounded by Participant 12:

> The slower ones that were outdoors, made me feel as though I was walking, so that's when I did the cross-trainer, if they were really slow, and yet there was a throbbing kind of beat, I would actually do my weights, and I would do more. (interview)

Exercisers also articulated a range of strategies that enabled them to limit their exposure to the music-video channel, one such strategy being attentional diversion:

> I probably just looked more at what's going on with the machine itself in terms of the speed, the rate, the distance, those sorts of bits I guess … sometimes I would just shut my eyes and concentrate more on the breathing … just switching off, going into another place in my mind. (Participant 11; interview)

Facility staff employed several accommodation strategies in response to undesirable effects concerning the music-video channel. These strategies were focused on environmental factors or the music-video channel (see Figure 2). For example, staff explained that despite having limited space, they used a novel approach to ensure that exercisers could access the music-video channel (i.e., an environmental factor) from most viewing angles:

> … it's a quite a long narrow room … what we've done there is use mirrors in front of them [pieces of equipment] … so that wherever you are, you can see the TV but you're not directly looking at it. (Participant 14; interview)

Equally, staff members described that they would change the music-video channel if they felt that this would be appreciated by the majority of members present within the facility:

> … if someone's gone in there and said "I would like this [channel] changed over" then we would be there while they asked everyone, or we would ask everyone and make sure that they were happy before turning it over. Obviously, if the majority wanted it, then we would go with it, if not, we wouldn't. (Participant 16; interview)

Following the social process of accommodation, exercisers and facility staff would engage in another appraisal of appropriateness with respect to the music-video channel, reflecting the notion that meanings are not permanent; rather, they are subjected to a process of modification and reappraisal (Blumer, 1969).

Discussion

This study developed a substantive theory that explained and predicted the social process of exercising in the presence of a music-video channel and, allied to this, managing a facility that displays a music-video channel. When viewed through the prism of the extant literature, the present model shares some similarities with conceptual frameworks that delineate the music listening process in exercise contexts (Clark et al., 2016; Karageorghis, 2016). For example, we found support for a three-stage process that commences with the qualities of the stimuli that are moderated by a range of factors in eliciting a variety of effects. Nonetheless, the substantive theory advances extant literature by offering numerous unique insights at each stage of the model and depicting relevant social processes.

Current conceptual frameworks that address the music listening experience in exercise contexts focus almost exclusively on the exerciser (Clark et al., 2016; Hallett & Lamont, 2015; Karageorghis, 2016). In contrast, the proposed substantive theory advances extant literature by presenting a dual perspective from individual exercisers *and* facility staff. Drawing comparisons with Corbin and Strauss's (2015) aforementioned coffee-shop illustration of process, this is analogous to exploring both the perspectives of waitresses and customers; ultimately providing a more holistic account of the social environment. The inclusion of facility staff was not an initial aim of ours, but a serendipitous addition that

occurred while following the trail of emerging concepts within the iterative grounded theory process (Corbin & Strauss, 2015). Theoretically sampling staff members greatly increased the practical utility of the model (Bryant, 2009) and can be applied by health psychologists as well as exercisers and facility staff.

The substantive theory provides the first exploration into the video and music-video components that are deemed important in an exercise context. Accordingly, researchers are urged to consider properties such as the characters, location, colors, lighting and narrative depicted in the video when selecting music-videos for experimental studies. This would allow researchers to fully justify their selections, as opposed to relying solely on the motivational qualities of music (e.g., Lin & Lu, 2013). Visuals depicting movement and characters promoting positive affective states were generally appraised by participants to be appropriate for exercise settings. This could be attributed to the mechanism termed "emotional contagion" (Juslin, 2013), wherein individuals "catch" the affective states of others unconsciously and unintentionally. The vocal *and* facial expressions of performers have been theorized as seminal factors in emotional contagion (Juslin & Västfjäll, 2008). Alternatively, it is plausible that such selections facilitated attentional dissociation, thereby diverting participants' attention from exercise-related interoceptive cues (Bird et al., 2019). Nonetheless, the substantive theory does not advocate a "one size fits all" approach, whereby one type of video will elicit a similar response for every type of viewer in every context. Rather, this is influenced by a combination of exerciser, exercise, environmental, and temporal factors that are delineated as moderators in the proposed theory. Additional research is required to examine the components that are preferred and under what circumstances, if this line of scientific investigation is to flourish.

Given the predominance of research into the enabling qualities of music, it has been suggested that researchers should consider the degree to which music (and by extension, music-video) can have a deleterious effect (Dibben, 2017). To this end, the proposed model extends our understanding of audiovisual applications in an exercise context by shedding light on the undesirable effects that a music-video channel might elicit when applied in a real-world context. For example, negative affective states were experienced by women owing to the gender inequality evident in some music-videos. In accordance with social comparison theory (Festinger, 1954), it is possible that such affective states were facilitated by upward comparisons to the thin body-type models frequently employed in music-videos (Bell, Lawton, & Dittmar, 2007). However, more research is required to examine such comparisons within an exercise context. Affective responses have been recognized as an important driver of physical activity behavior (Ekkekakis, Zenko, Ladwig, & Hartman, 2018). Hence, it is imperative that we understand how audiovisual stimuli might contribute toward feelings of pleasure and displeasure if we are to combat physical inactivity.

The present theory offers a fulsome representation of the data that were collected from a specific group and setting (Corbin & Strauss, 2015). Hence, the findings should be interpreted with reference to physically active people. Furthermore, the findings are confined to those exercise facilities that display music-video channels using communal televisions that are managed by staff members. Future research might seek to examine the experiences of engaging with music-video channels among other populations (e.g., previously inactive people). In addition, more research is needed to examine the range of audiovisual stimuli that is typically on offer within exercise facilities, in order to determine which are the most appropriate. Given that pieces of gym equipment often contain personalized screens with a multitude of channels on offer, this represents a viable and pragmatic direction for future inquiry, which might involve the linking of substantive theories into a more formal grounded theory (Corbin & Strauss, 2015; Weed, 2017).

Practical implications

Perhaps the most significant practical implication to stem from the study concerns the core category of the proposed model. We suggest that music-video channels should be chosen according to the degree that they are *appropriate* with respect to exerciser, exercise, environmental, and temporal factors. When the content of a music-video channel is deemed appropriate, the substantive theory predicts that desirable effects will ensue. Conversely, when the content is considered inappropriate, undesirable effects are predicted, leading to the social processes of conflict and accommodation. Hence, facility staff are advised to question whether their environment is conducive to the watching of a music-video channel, seek the audiovisual preferences of their members and be conscious that the collective preferences of their members are likely to change over time (i.e., throughout a single day and over an extended period; Krause & North, 2018). Likewise, exercisers are advised to appreciate that suitable content will vary depending on the components of their exercise (e.g., intensity) and their individual responses (e.g., feeling states), which again, are subject to change over time.

The model can be used to identify the components of a music-video channel that are deemed salient in order to enhance selections in exercise contexts. Exercisers and facility staff are urged to recognize that broadcasters often supplement music-video channels

with additional audiovisual stimuli (e.g., celebrity news, adverts), which might violate individuals' audiovisual expectancies within an exercise context (cf. Juslin, 2013). Moreover, staff members can draw upon the effects depicted by the substantive theory (e.g., logistical) to ensure that they are adequately prepared for the consequences of displaying a music-video channel within their facility.

Algorithms developed by music streaming services can create personalized playlists for subscribers; however, such an approach has yet to be adopted for group exercise contexts. Accordingly, there is considerable scope for broadcasters and streaming services to optimize the music-video selection process in exercise facilities. In the near future, it is plausible that algorithms will be capable of ingesting music-video metadata and weighing each of the proposed moderators in order to optimize the selection process. In practice, this might result in automatic volume control during peak times to counter the noise of equipment, tailoring selections to match exercise modalities, and accommodating for the exercisers' seasonal preferences (Krause & North, 2018). Automating the selection process might lead to a reduction in potential conflict and thus enhance the exercise experience.

Strengths and limitations

This is the first study in the psychology literature to examine how music-videos are presented to a broad sample of exercisers outside of a laboratory setting. The posters used at the facility and inclusion criteria resulted in the recruitment of participants with varying opinions regarding music-video channels (i.e., some liked them while others disliked them). Moreover, the authors strived to demonstrate "methodological coherence" (Holt & Tamminen, 2010b) in terms of their philosophical orientation, research question, participants, and methods; something that has been rarely achieved in this literature (Weed, 2017).

In terms of limitations, it could be argued that asking a range of exercisers to simultaneously complete diary sheets over a 4-week period "does not adhere strictly to theoretical sampling." However, it is important to note that theoretical sampling involves collecting data, raising questions about concepts, and using such questions as a guide for what incidents to look out for within the next set of data, as opposed to simply recruiting new participants (Corbin & Strauss, 2015). The facility had a small selection of music-video channels from which staff members could choose, none of which were curated specifically for the exercise context. Nonetheless, this limitation applies to every current digital broadcasting provider in the UK, none of which showcase a music-video channel dedicated to the exercise context.

Readers can apply the concepts of fit, work, relevance, and modifiability when evaluating the quality of the present findings (Weed, 2017). Moreover, they can draw upon the criterion postulated by Corbin and Strauss (e.g., evidence of context and process; Corbin and Strauss, 2015). In accordance with the pragmatist notion that all knowledge is provisional, readers are also encouraged to apply the "difference principle" (Bryant, 2009). That is, to consider the extent to which the substantive theory functions as a useful tool and offers practical solutions relating to the use of music-video channels in an exercise context.

Conclusion

The objective of this study was to develop a substantive theory that explained and predicted the social process of exercising in the presence of a music-video channel and managing an exercise facility that displays such a channel. Data derived from reflective diaries and semistructured interviews were analyzed and integrated to construct a substantive theory of the studied phenomena (see Figure 2). The findings suggest that the role of a music-video channel in an exercise context is more complex than previously thought and one that has the potential to cause conflict if implemented inappropriately. Given the increasing prevalence of music-video channels in exercise settings as well as a conspicuous lack of conceptual frameworks, the substantive theory provides a useful reference point.

What does this article add?

The present study is the first to propose a substantive theory that explains and predicts the social process of exercising in the presence of a music-video channel and managing a facility that displays such a channel. Merely selecting a music-video channel for display in an exercise context can be likened to a swinging pendulum that has the potential to facilitate a range of both desirable and undesirable outcomes for those in the social environment (i.e., exercisers and facility staff). We propose that in order to maximize the likelihood of desirable effects, careful consideration should be given to the specific components of music-video channels and the degree to which they are appropriate to relevant exerciser, exercise, environmental, and temporal factors.

ORCID

Jonathan M. Bird http://orcid.org/0000-0003-3929-8783
Costas I. Karageorghis http://orcid.org/0000-0002-9368-0759

References

Bell, B. T., Lawton, R., & Dittmar, H. (2007). The impact of thin models in music videos on adolescent girls' body dissatisfaction. *Body Image*, *4*, 137–145. doi:10.1016/j.bodyim.2007.02.003

Bigliassi, M., Peruzollo, A. S., Kanthack, T. F. D., Barreto-Silva, V., Pezarat-Correia, P., & Atimari, L. R. (2014). Effects of a sensory strategy in an isometric muscular endurance task. *Revista Andaluza De Medicina Del Deporte*, *7*, 55–59. doi:10.1016/S1888-7546(14)70062-0

Bird, J. M., Hall, J., Arnold, R., Karageorghis, C. I., & Hussein, A. (2016). Effects of music and music-video on core affect during exercise at the lactate threshold. *Psychology of Music*, *44*, 1471–1487. doi:10.1177/0305735616637909

Bird, J. M., Karageorghis, C. I., Baker, S. J., & Brookes, D. A. (2019). Effects of music, video, and 360-degree video on cycle ergometer exercise at the ventilatory threshold. *Scandinavian Journal of Medicine & Science in Sports*, *29*, 1161–1173. doi:10.1111/sms.13453

Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Berkeley: University of California Press.

Bryant, A. (2009). Grounded theory and pragmatism: The curious case of Anselm Strauss. *Forum: Qualitative Social Research*, *10*, 2.

Clark, I. N., Baker, F. A., & Taylor, N. F. (2016). The modulating effects of music listening on health-related exercise and physical activity in adults: A systematic review and narrative synthesis. *Nordic Journal of Music Therapy*, *25*, 76–104. doi:10.1080/08098131.2015.1008558

Corbin, J. M., & Strauss, A. L. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (4th ed.). Los Angeles, CA: Sage.

Dibben, N. (2017). Music as enabling: Enhancing sport, work, and other pursuits. In R. Ashley & R. Timmers (Eds.), *The Routledge companion to music cognition* (pp. 377–388). New York, NY: Routledge.

Ding, D., Lawson, K. D., Kolbe-Alexander, T. L., Finkelstein, E. A., Katzmarzyk, P. T., van Mechelen, W., & Pratt, M. (2016). The economic burden of physical inactivity: A global analysis of major non-communicable diseases. *Lancet*, *388*, 1311–1324. doi:10.1016/S0140-6736(16)30383-X

Ekkekakis, P., Zenko, Z., Ladwig, M. A., & Hartman, M. E. (2018). Affect as a potential determinant of physical activity and exercise. In D. M. Williams, R. E. Rhodes, & M. T. Conner (Eds.), *Affective determinants of health behavior* (pp. 237–261). New York, NY: Oxford University Press.

Ferrari, P. F., & Rizzolatti, G. (2014). Mirror neuron research: The past and the future. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *369*, 20130169. doi:10.1098/rstb.2013.0169

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*, 117–140.

Hallett, R., & Lamont, A. (2015). How do gym members engage with music during exercise? *Qualitative Research in Sport, Exercise and Health*, *7*, 411–427.

Holt, N. L. (2016). Doing grounded theory in sport and exercise. In B. Smith & A. C. Sparkes (Eds.), *Routledge handbook of qualitative research in sport and exercise* (pp. 24–36). London, UK: Routledge.

Holt, N. L., & Tamminen, K. A. (2010a). Improving grounded theory research in sport and exercise psychology: Further reflections as a response to Mike Weed. *Psychology of Sport and Exercise*, *11*, 405–413. doi:10.1016/j.psychsport.2009.12.002

Holt, N. L., & Tamminen, K. A. (2010b). Moving forward with grounded theory in sport and exercise psychology. *Psychology of Sport and Exercise*, *11*, 419–422. doi:10.1016/j.psychsport.2010.07.009

Hutchinson, J. C., & Karageorghis, C. I. (2013). Moderating influence of dominant attentional style and exercise intensity on responses to asynchronous music. *Journal of Sport & Exercise Psychology*, *35*, 625–643. doi:10.1123/jsep.35.6.625

Hutchinson, J. C., Karageorghis, C. I., & Jones, L. (2015). See hear: Psychological effects of music and music-video during treadmill running. *Annals of Behavioral Medicine*, *49*, 199–211. doi:10.1007/s12160-014-9647-2

Jones, L., & Ekkekakis, P. (2019). Affect and prefrontal hemodynamics during exercise under immersive audiovisual stimulation: Improving the experience of exercise for overweight adults. *Journal of Sport and Health Science*, *8*, 325–338. doi:10.1016/j.jshs.2019.03.003

Juslin, P. N. (2013). From everyday emotions to aesthetic emotions: Towards a unified theory of musical emotions. *Physics of Life Reviews*, *10*, 235–266. doi:10.1016/j.plrev.2013.05.008

Juslin, P. N., & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences*, *31*, 559–575. doi:10.1017/S0140525X08005293

Karageorghis, C. I. (2016). The scientific application of music in exercise and sport: Towards a new theoretical model. In *Sport and exercise psychology: Topics in applied psychology* (2nd., pp. 276–322). London, UK: Routledge.

Karageorghis, C. I. (2017). *Applying music in exercise and sport*. Champaign, IL: Human Kinetics.

Krause, A. E., & North, A. C. (2018). Tis the season: Music-playlist preferences for the seasons. *Psychology of Aesthetics, Creativity, and the Arts*, *12*, 89–95. doi:10.1037/aca0000104

Lin, J.-H., & Lu, F. J.-H. (2013). Interactive effects of visual and auditory intervention on physical performance and perceived effort. *Journal of Sports Science & Medicine*, *12*, 388–393.

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, *20*, 1045–1053.

Park, M., Thom, J., Mennicken, S., Cramer, H., & Macy, M. (2019). Global music streaming data reveal diurnal and seasonal patterns of affective preference. *Nature Human Behaviour*, *3*, 230–236. doi:10.1038/s41562-018-0508-z

Rhodes, R. E., Saelens, B. E., & Sauvage-Mar, C. (2018). Understanding physical activity through interactions between the built environment and social cognition: A systematic review. *Sports Medicine*, *48*, 1893–1912. doi:10.1007/s40279-018-0934-0

Weed, M. (2017). Capturing the essence of grounded theory: The importance of understanding commonalities and variants. *Qualitative Research in Sport, Exercise and Health*, *9*, 149–156.

World Health Organization. (2018, February 23). *Physical activity*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/physical-activity